Executive Summary Version

INTERRELATED CHALLENGES:

- *Growth and Congestion*
- *Freight Movement*
- *Air Quality & Environment*
- *Energy, Fuels, and Prices*
- *Transportation Finance*
- *Economics and Institutions*

San Bernardino Associated Governments
Ty Schuiling, Director of Planning & Programming
April 21, 2010

Governments
SANBAG
Working Together

SCAG Region…forecast growth like adding the cities of Chicago and Houston in the next 25 years

SCAG Region 2035 Forecast Population & Employment Growth (Millions)

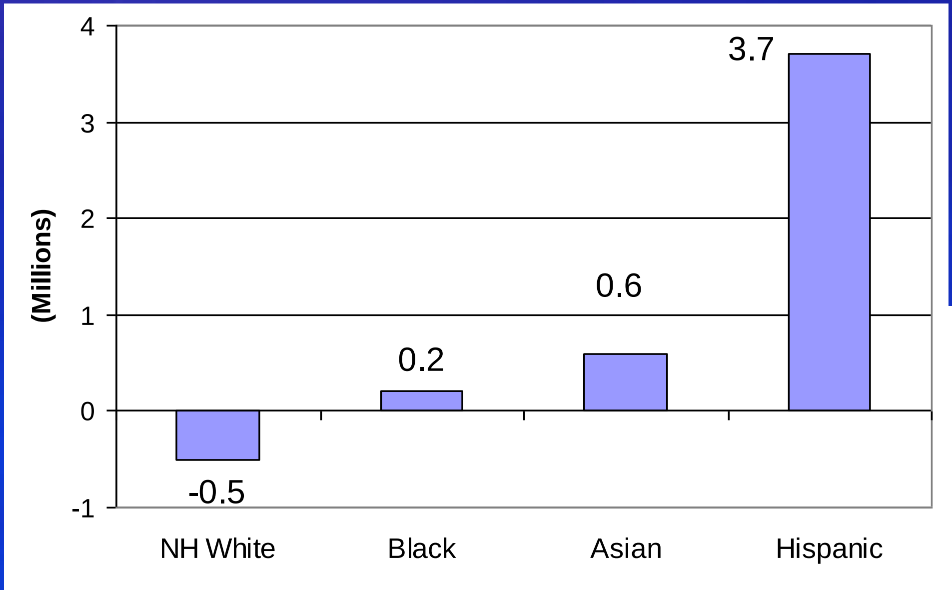
	2008	2035	Increase
Population	18.6	23.8	28%
Employment	7.8	9.9	27%

2

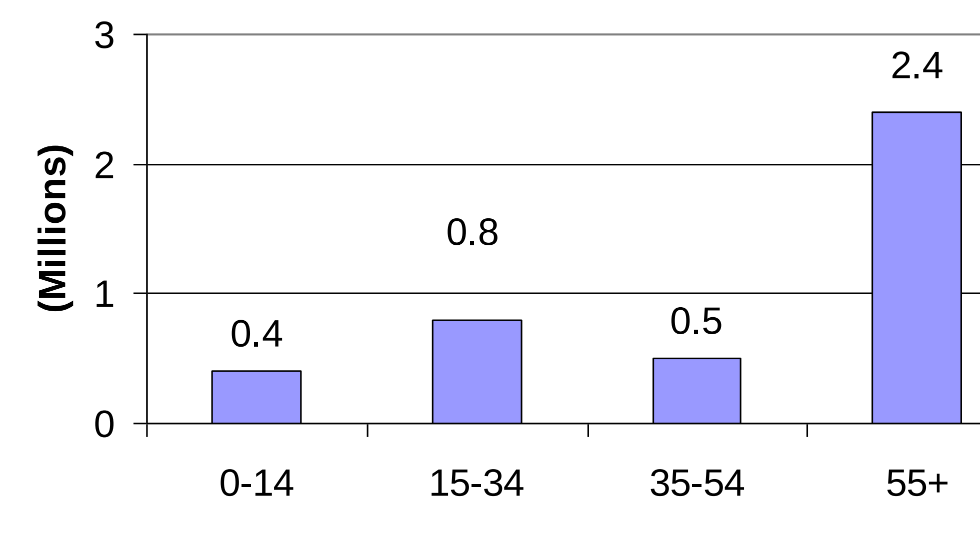
Who will they be??

SCAG Region Population Growth 2005-2025

More Hispanic…



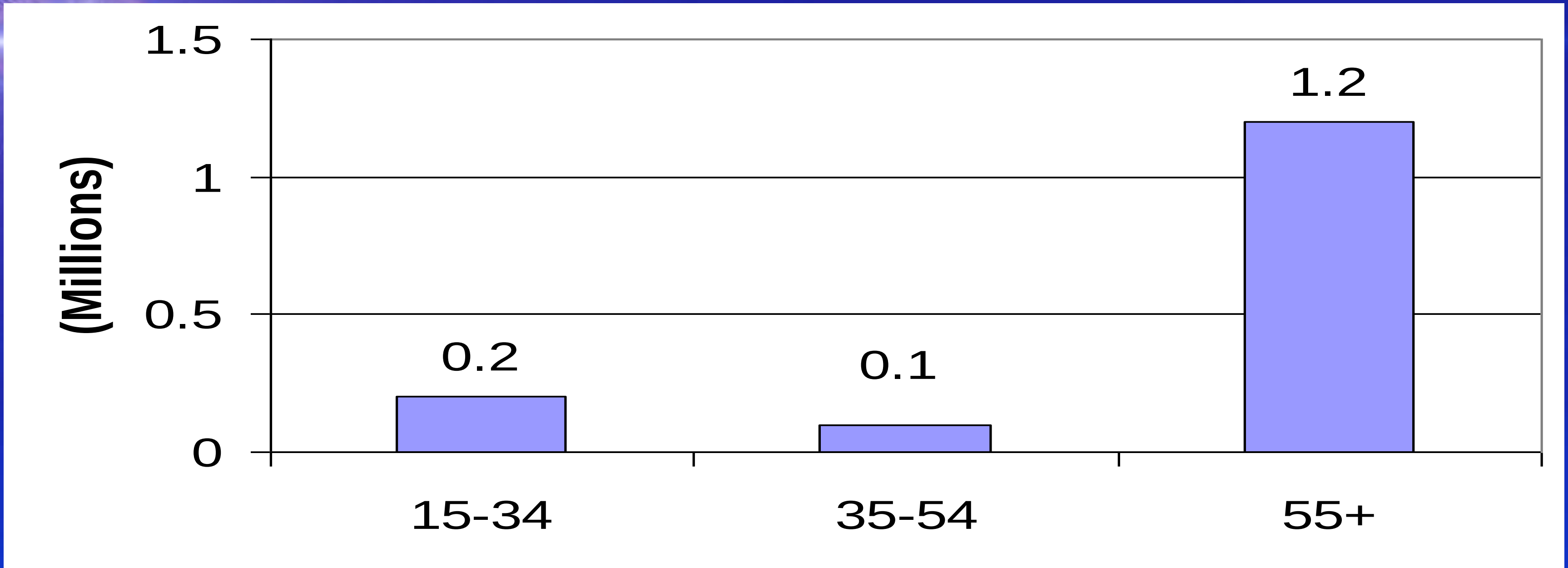
Older…



Demographic data and analysis provided courtesy Frank Wen, SCAG

Added households will be much older!

SCAG Region Households Growth Age 2005-2025



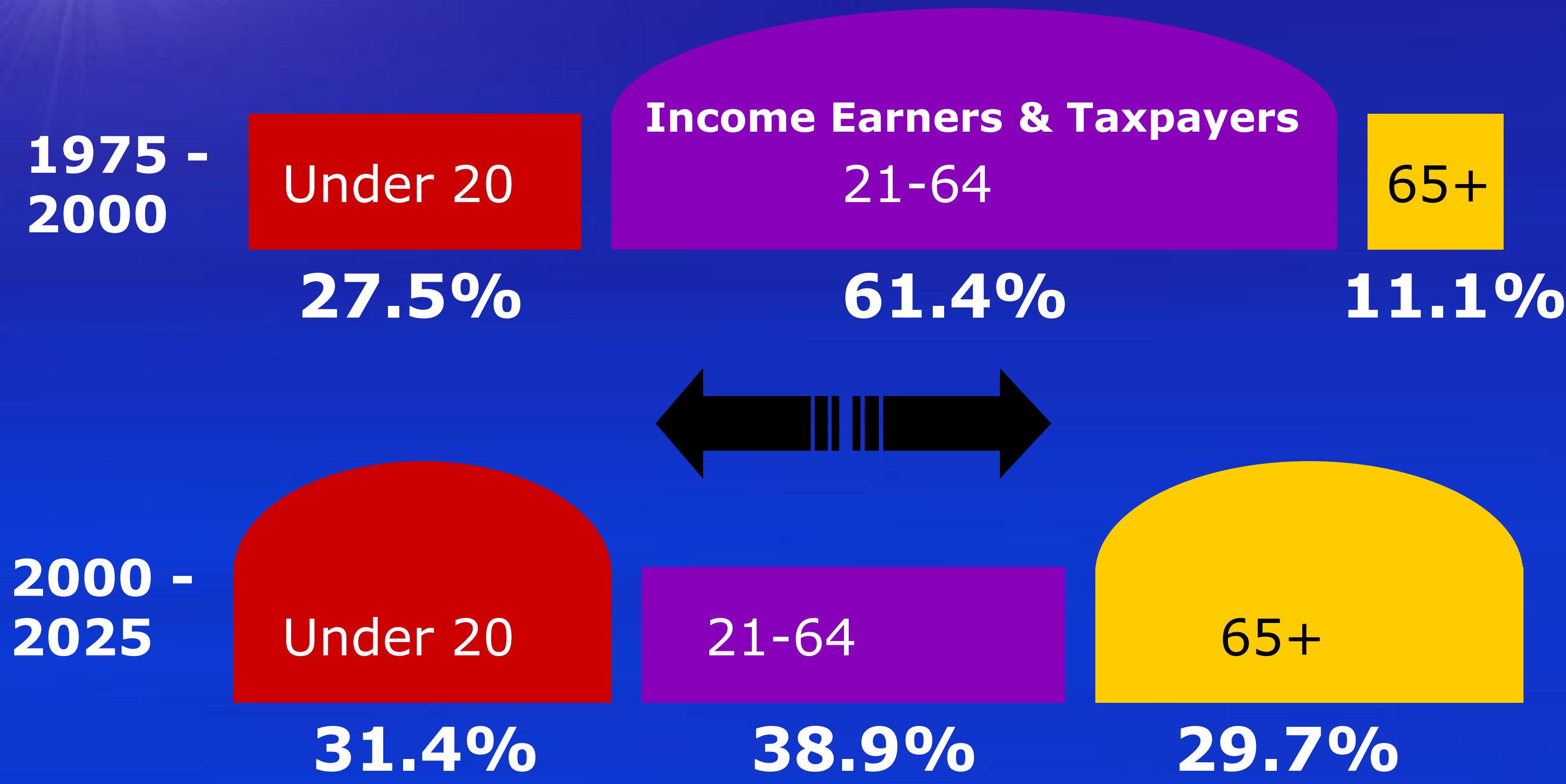
Demographic data and analysis provided courtesy Frank Wen, SCAG

Household composition is changing:

Household Type	1960	2005	2040
HH with Children	48%	32%	26%
HH without Children	52%	68%	74%
Single/Other HH	*13%*	*31%*	*34%*

Source: Arthur C. Nelson, Presidential Professor & Director of Metropolitan Research, University of Utah

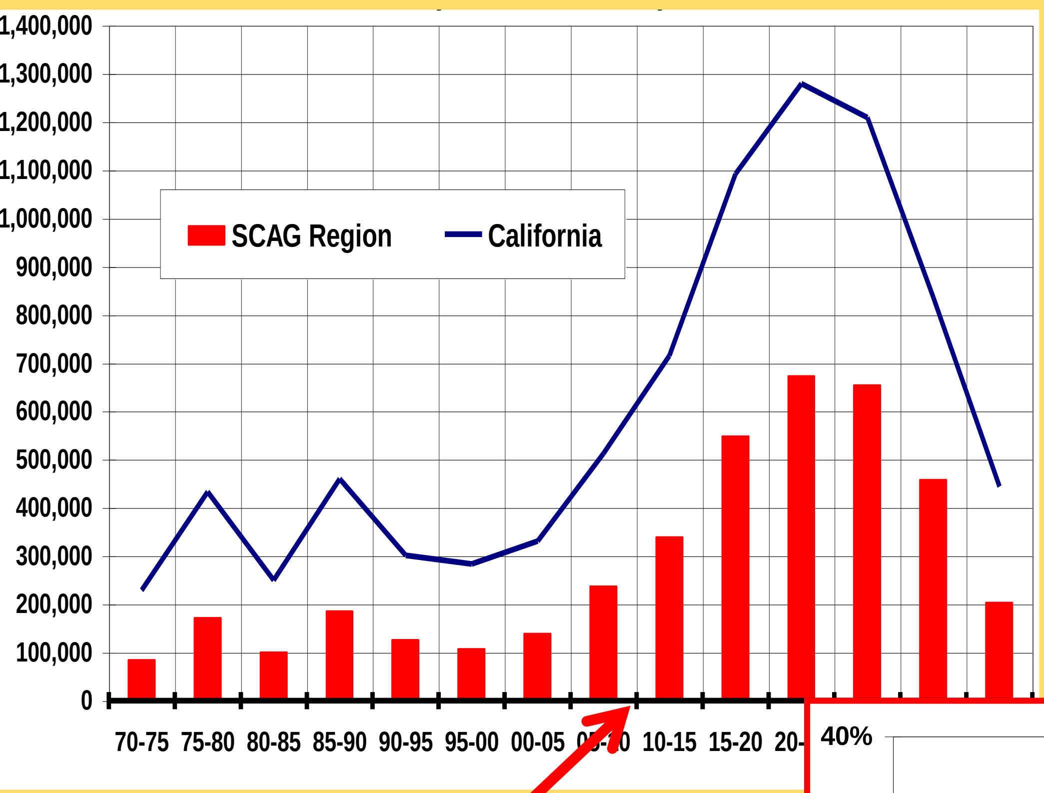
Huge Shift in Age of Population:
From wage-earners to retirees



Demographic data and analysis provided courtesy Frank Wen, SCAG

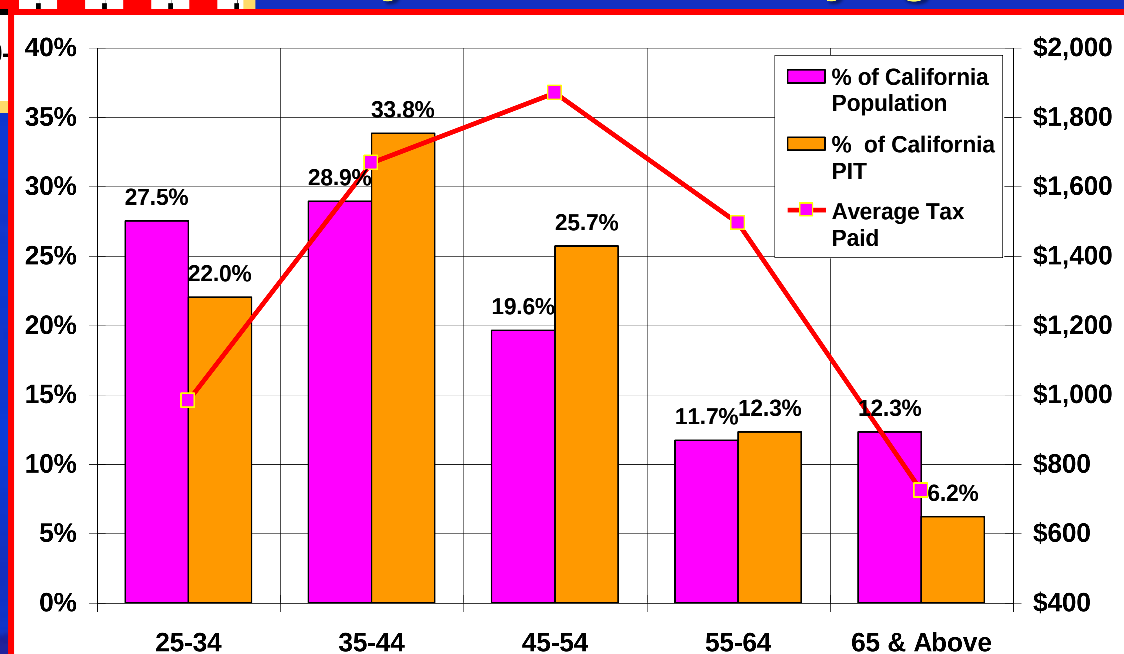
Growth in 65+ cohort, 1970 - 2040

Demographic data and analysis provided courtesy Frank Wen, SCAG



We are here

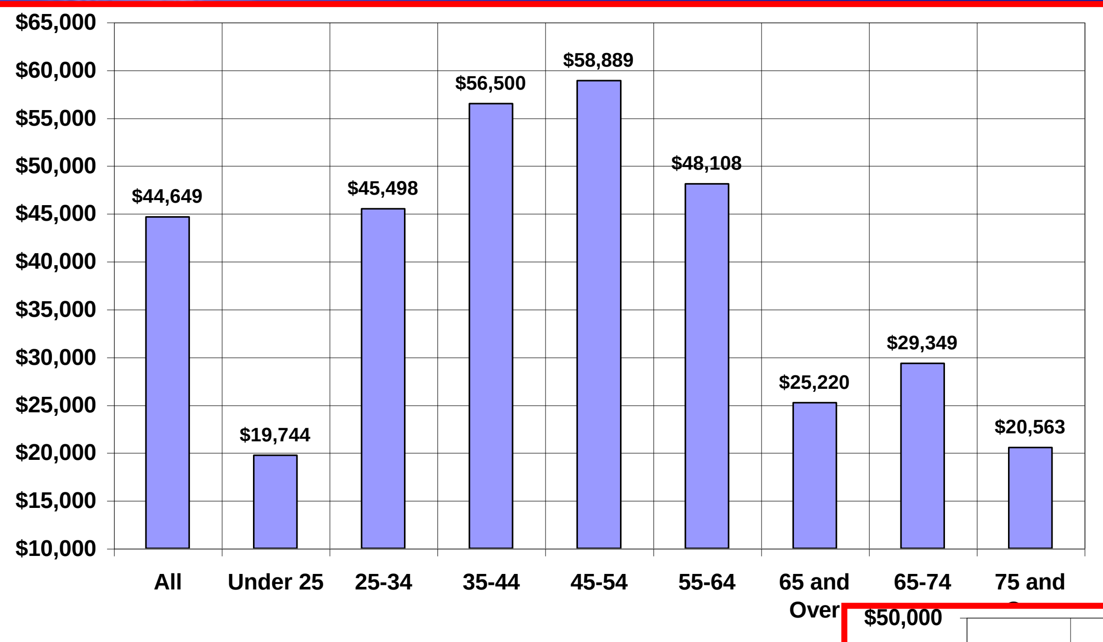
Personal Income Taxes Paid By Californians – by age



Source: California State Controller

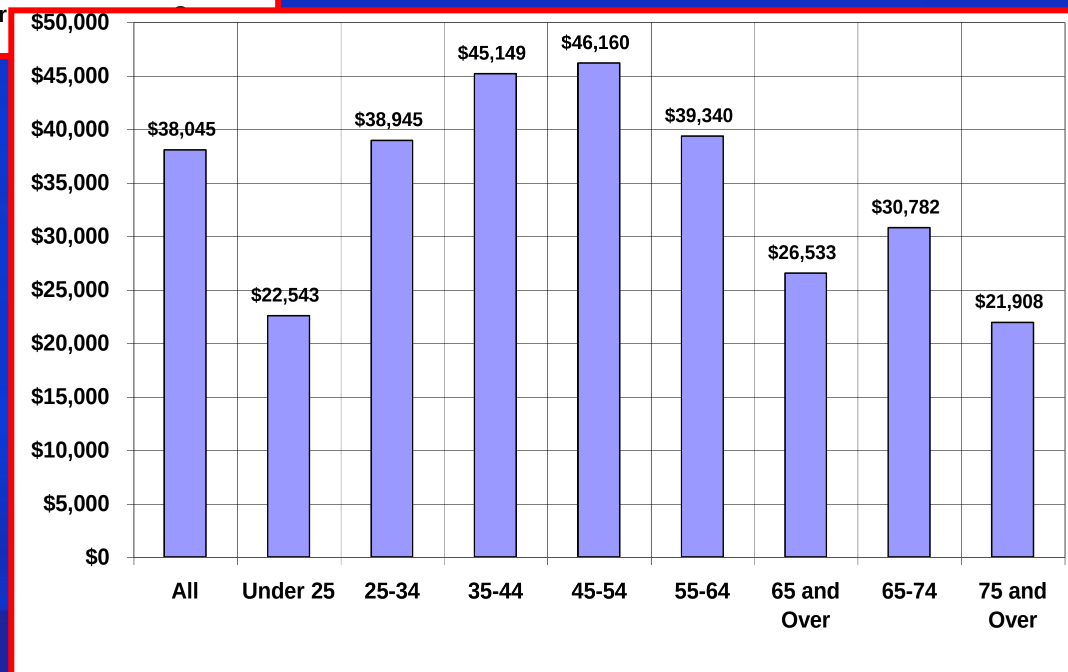
Average households by age group:

Incomes

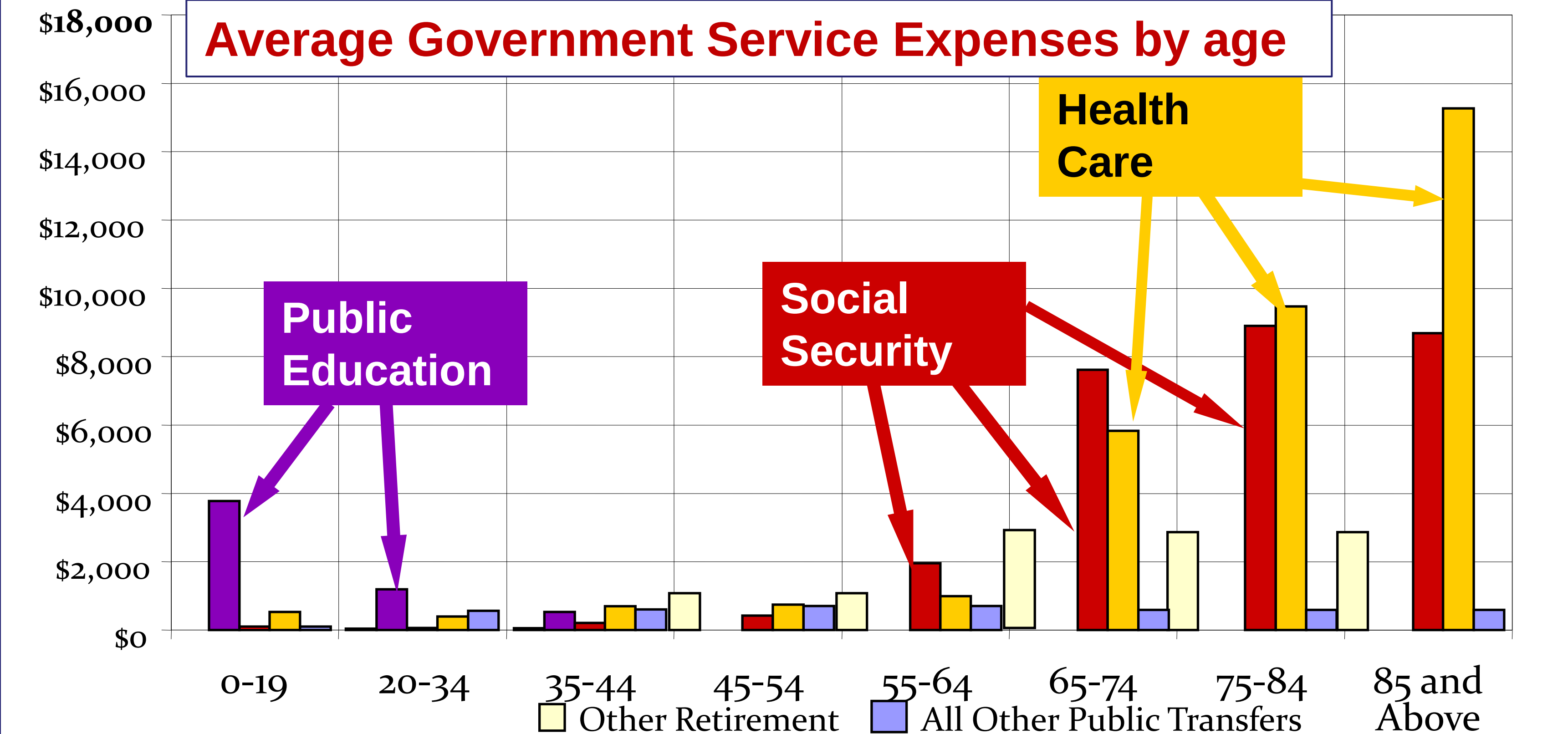


Expenditures

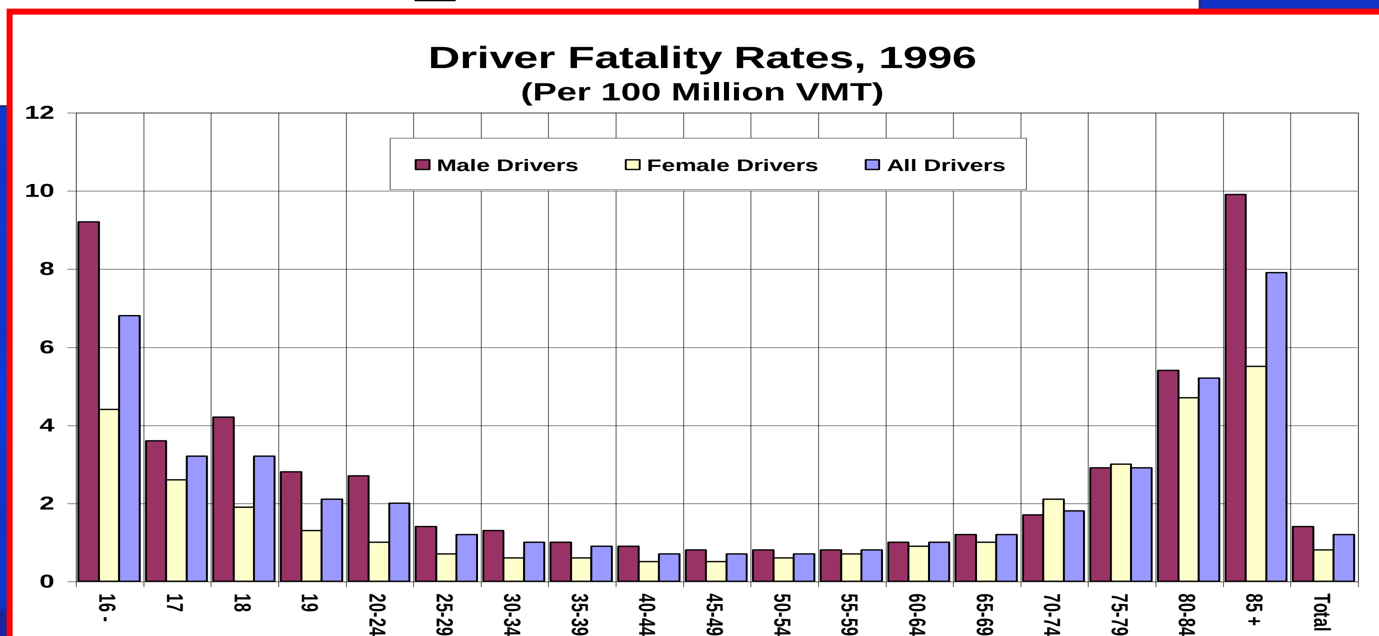
(think sales tax)



Source: 2000 Consumer Expenditure Survey



Planning for an aging population



Indications from the demography:

- Reduction in per capita income tax and sales tax revenues (principal sources of state, local, transportation funding)
- Increasing demand for government services
- Increased demand for small lot detached and attached residences, but a surplus of large-lot (7,000 sq ft+) homes
- Increasing need for safer alternatives to the auto for our aging population

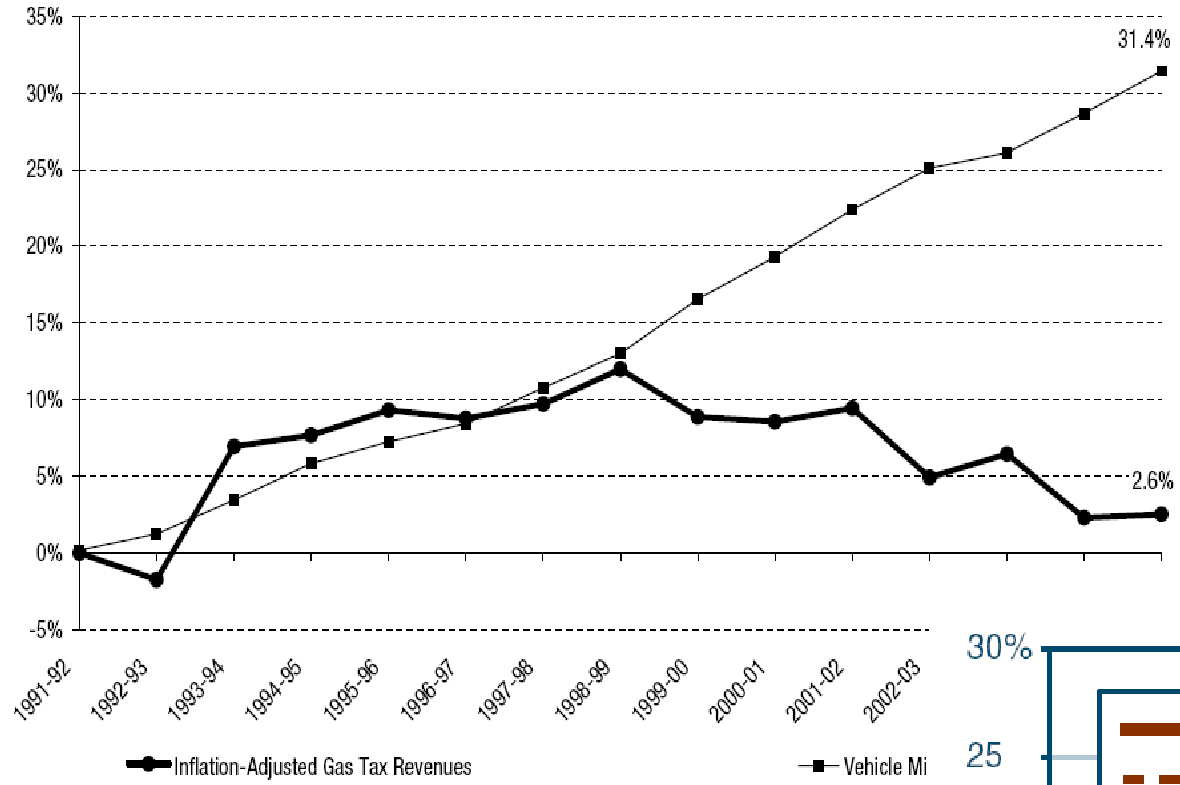
Transportation…

California's Roads More Crowded Than Other States

Rank (2003)	Urban Area	Miles Driven Per Highway Lane-Mile
1	Los Angeles-Long Beach-Santa Ana, CA	23,248
2	Riverside-San Bernardino, CA	21,429
3	San Francisco-Oakland, CA	20,242
4	Chicago, IL-IN	19,516
5	San Diego, CA	19,460
6	Sacramento, CA	19,303
7	Atlanta, GA	19,077
8	Miami, FL	19,057
9	Houston, TX	18,970
10	Oxnard-Ventura, CA	18,873

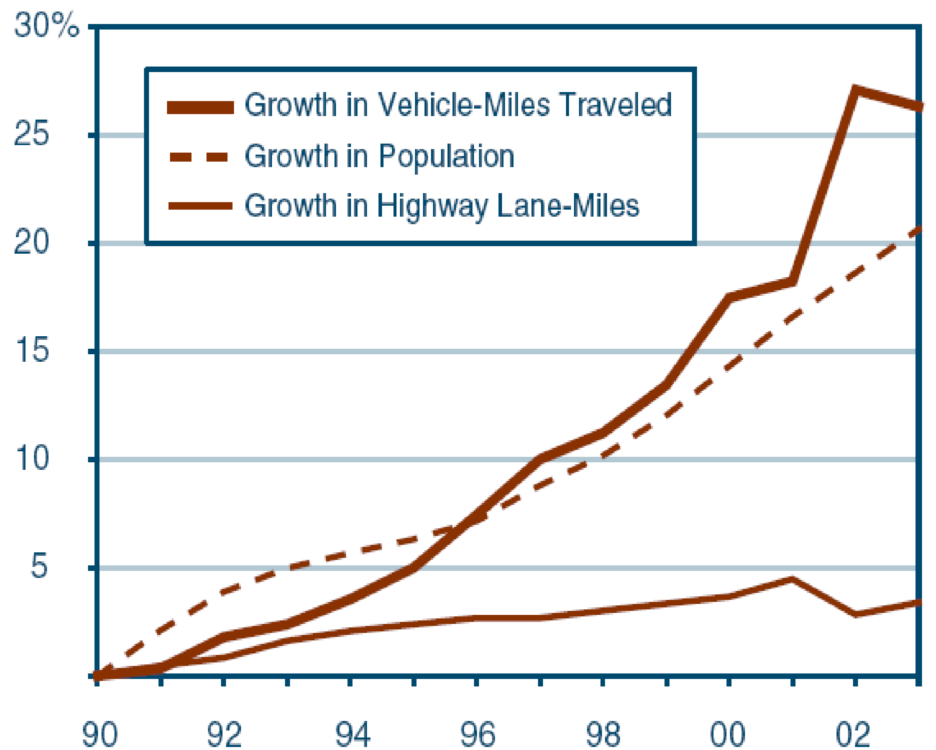
Source: California Travels – Legislative Analyst, 2007

State gasoline tax has not kept pace with travel

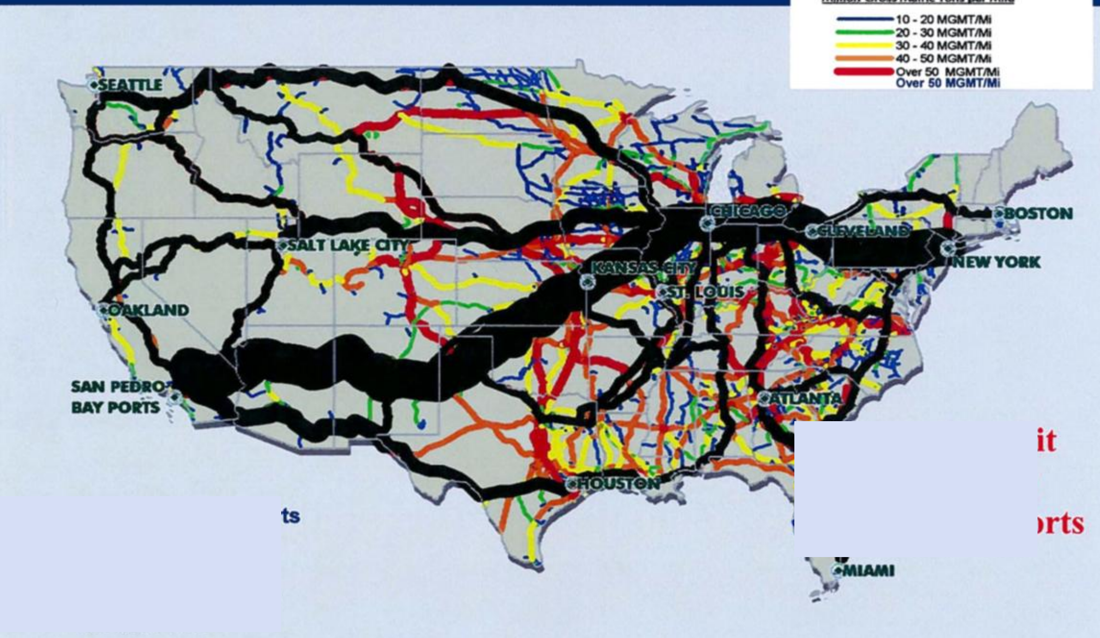


Source: Legislative Analyst's Office

System capacity has not kept pace with growth



Inter-modal Trade Volume

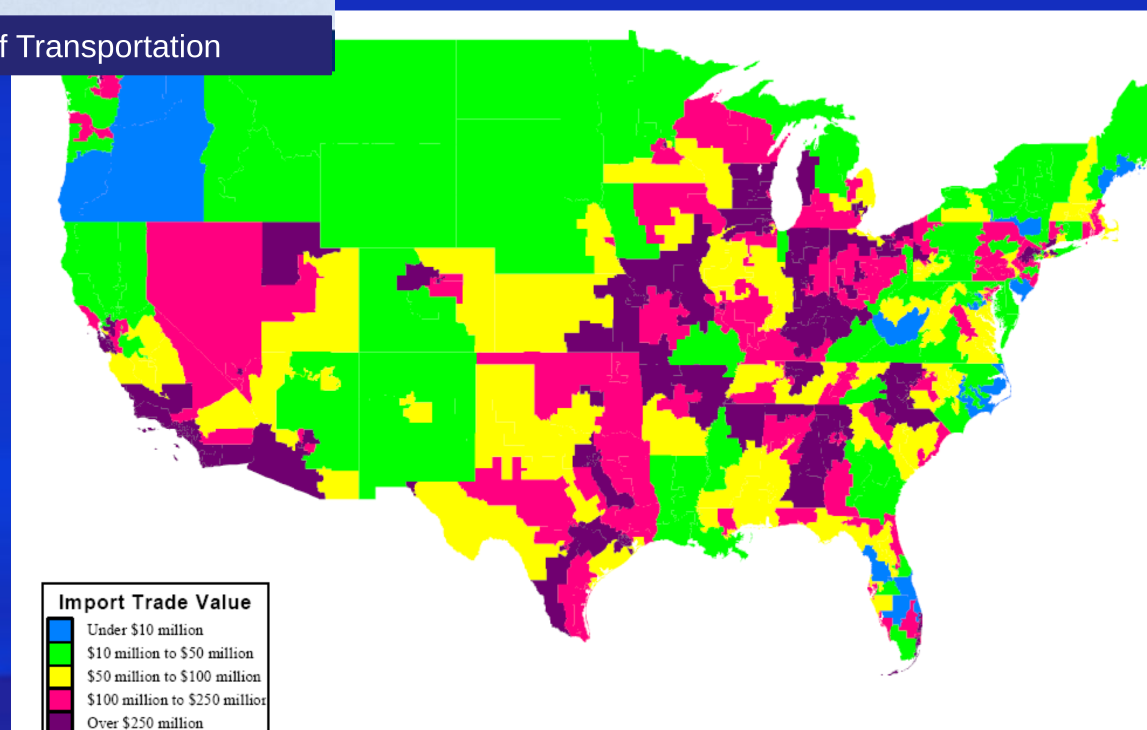


Source: US Department of Transportation

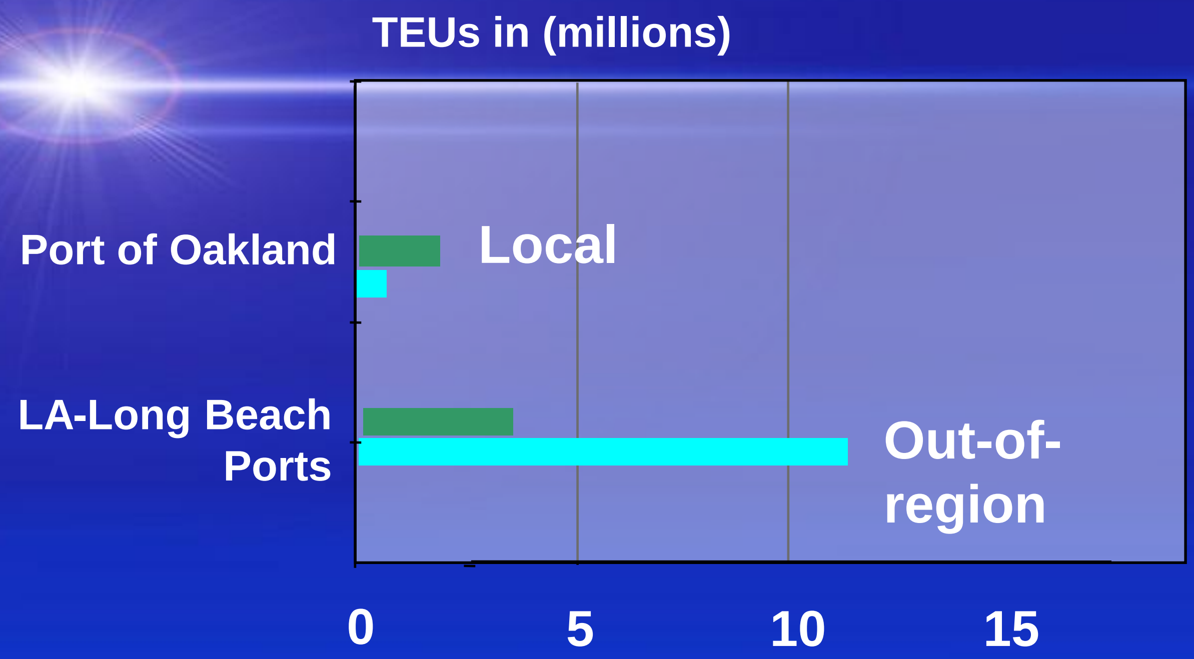
Freight:

We're No. 1!

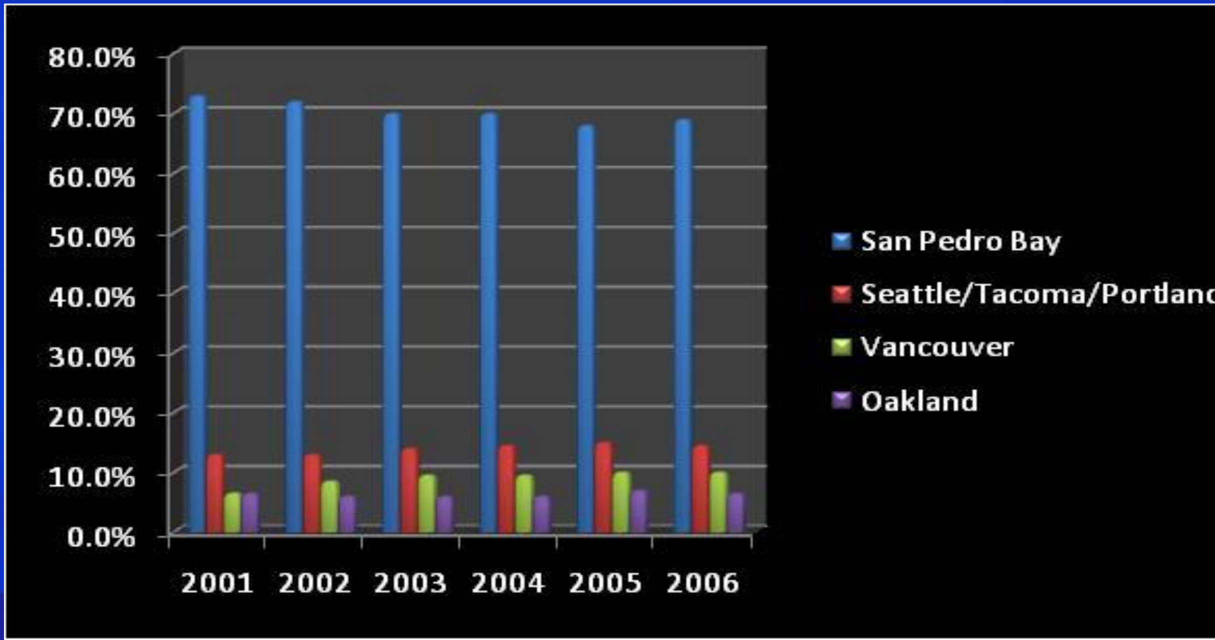
Estimated Trade Value by Congressional District



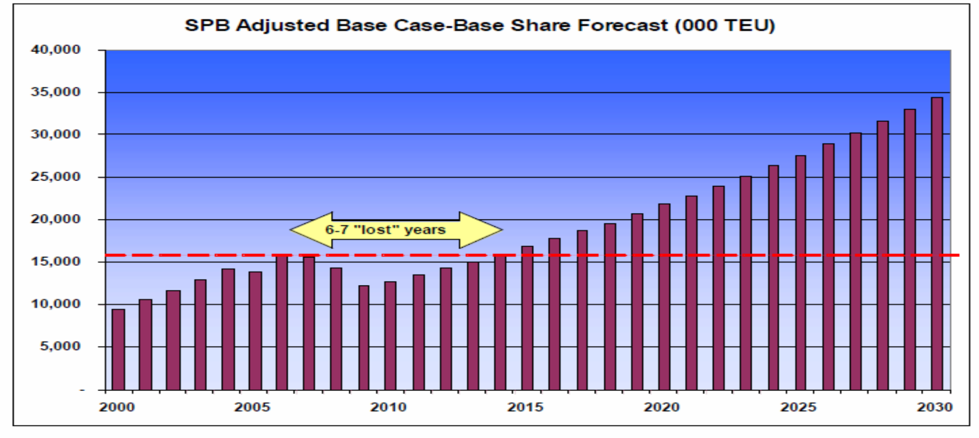
Containers at West Coast Ports



Share, west coast ports



New San Pedro Bay Forecast:



- More intact movement of goods via the Panama Canal.
- Development of multiple import supply chains using ports on all three coasts.
- Growth in trade with regions such as Europe and Latin America that favor the East or Gulf Coast ports.
- Increased competition from West Coast ports

Should Consider:

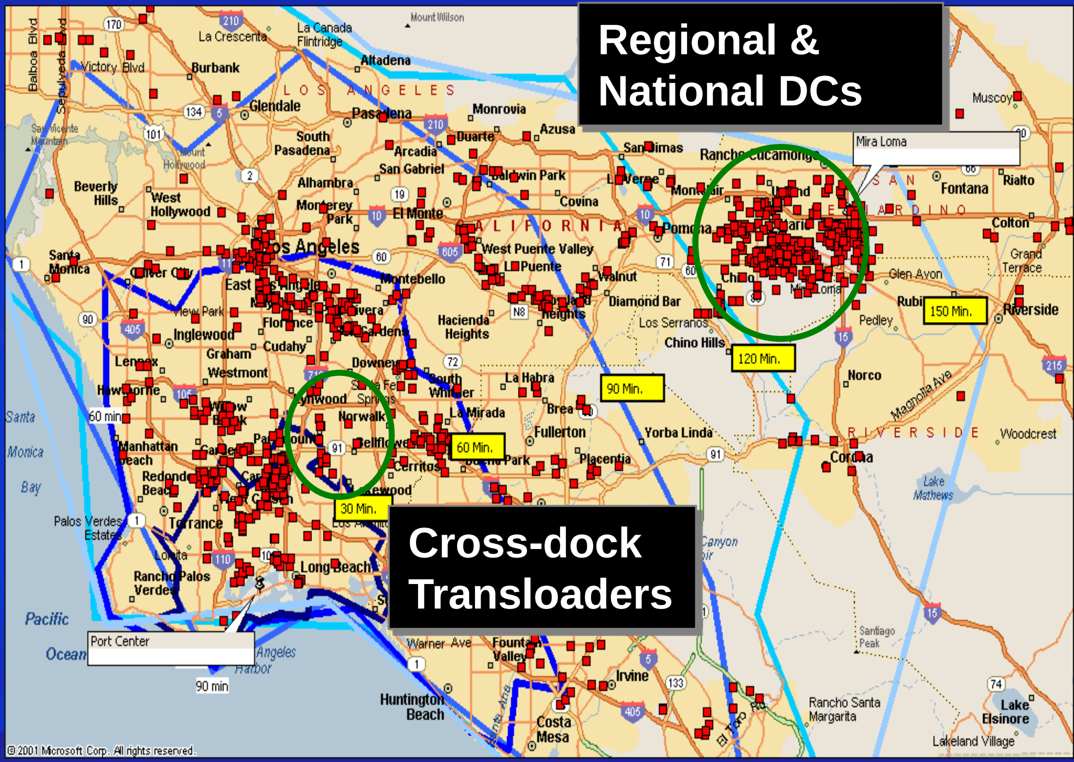
- Transport cost increases related to fuel price
- Narrowing of labor cost disparities

The Transloading Advantage

Transloading of weekly shipments from Asia affords large retailers an 18-20% reduction in their total pipeline plus safety stock inventory compared to direct shipping.

1 billion sq ft of warehouses today

Where will the next ½ billion sq. ft. go?

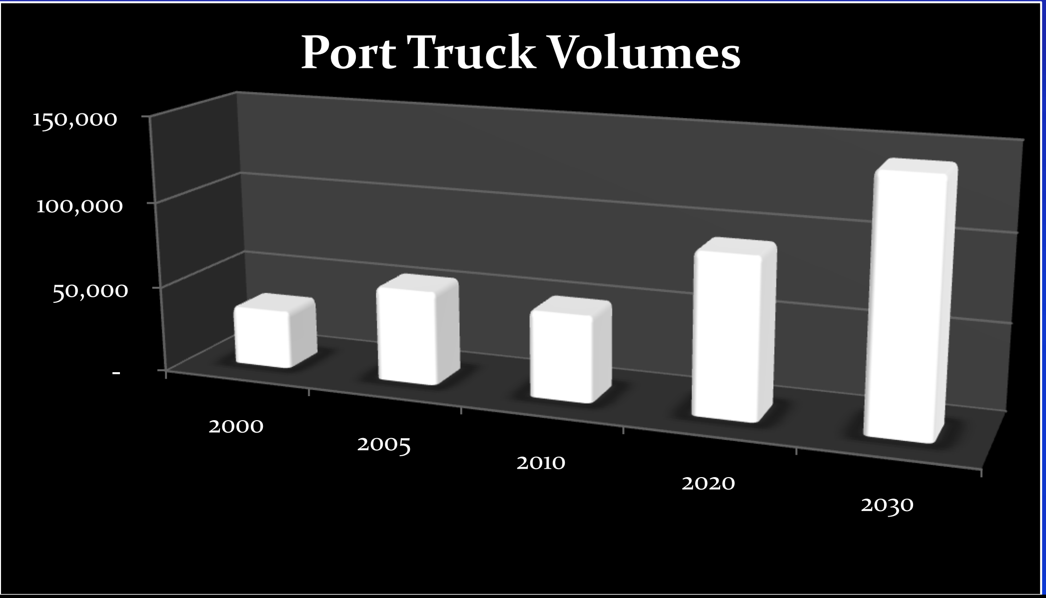


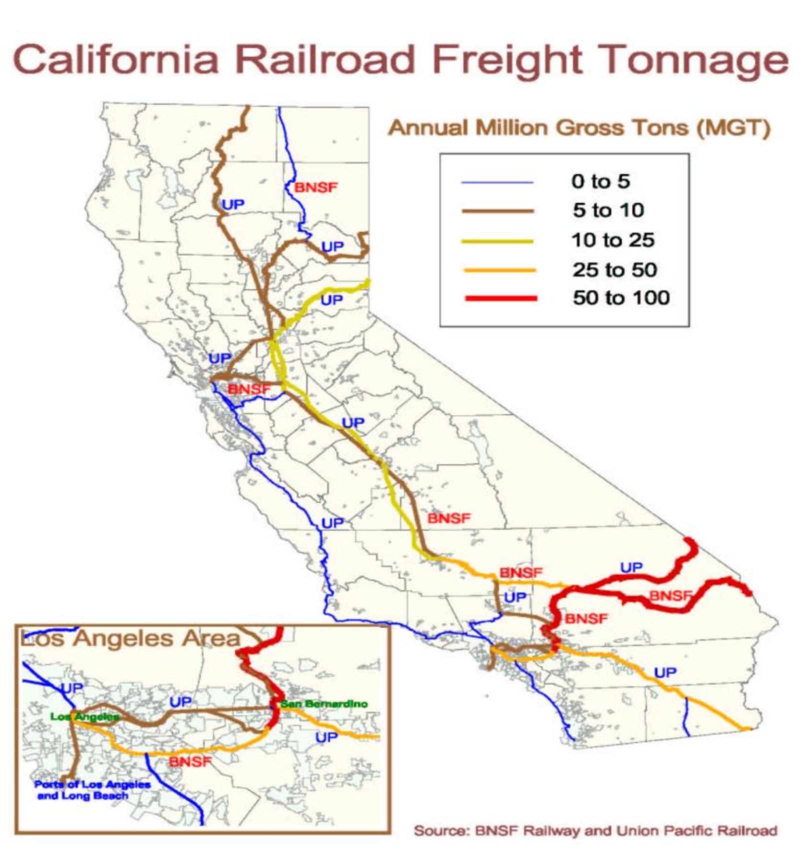
The Port and Modal Elasticity Study found:

1. Inadequate landside freight capacity will strangle port growth absent major improvements

2. Failure to address landside congestion will cause diversion/loss of market share, and loss of logistics jobs

Source: Gill V. Hicks Associates



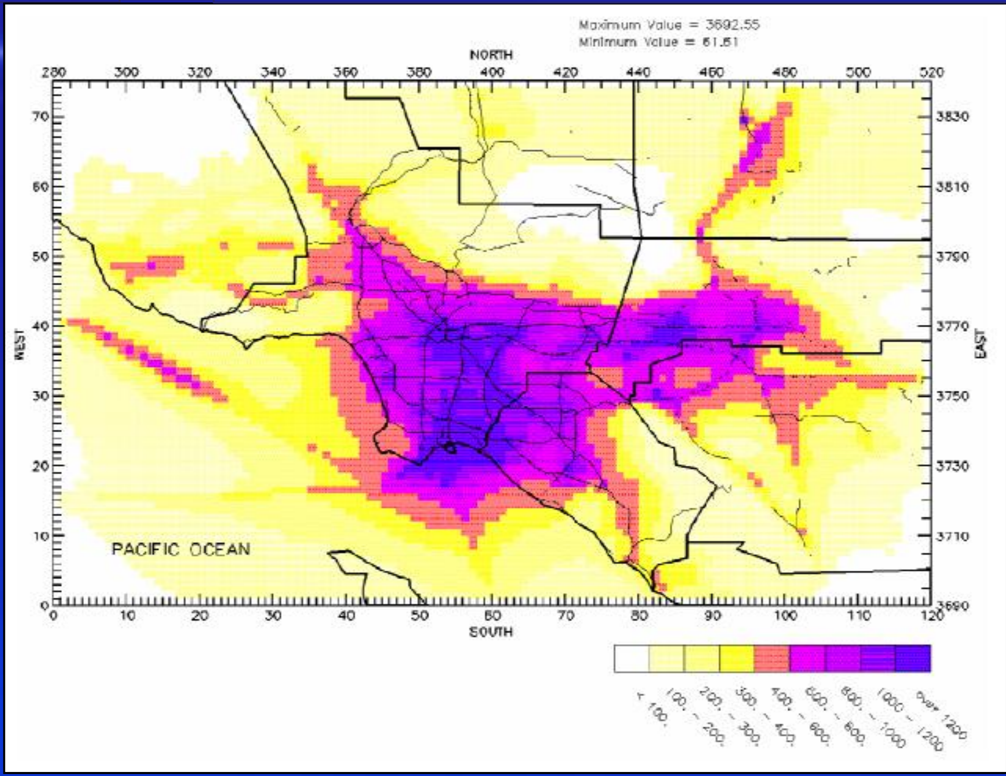


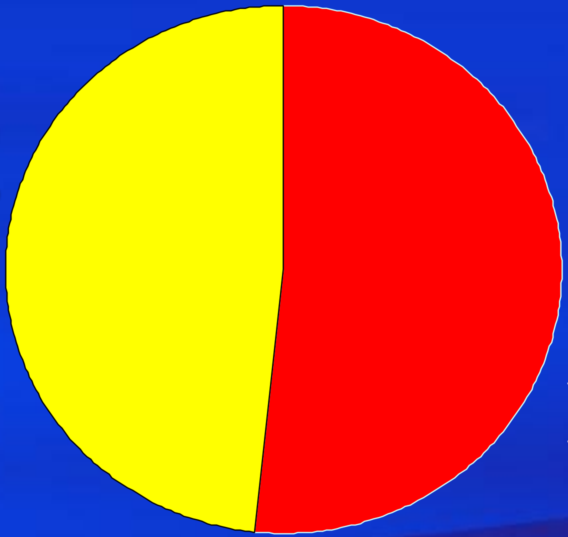
Year	Train Type	Average Delay
2016?	BNSF Freight	206.3 minutes
	UP Freight	196.9 minutes

Community Impacts of Freight:

Grade crossing delay and noise

Carcinogenic air toxics





Rest of Nation
48%

South Coast Air Basin
52%

Extreme PM2.5 Exposure

Recent CARB Assessment of PM Health Effects

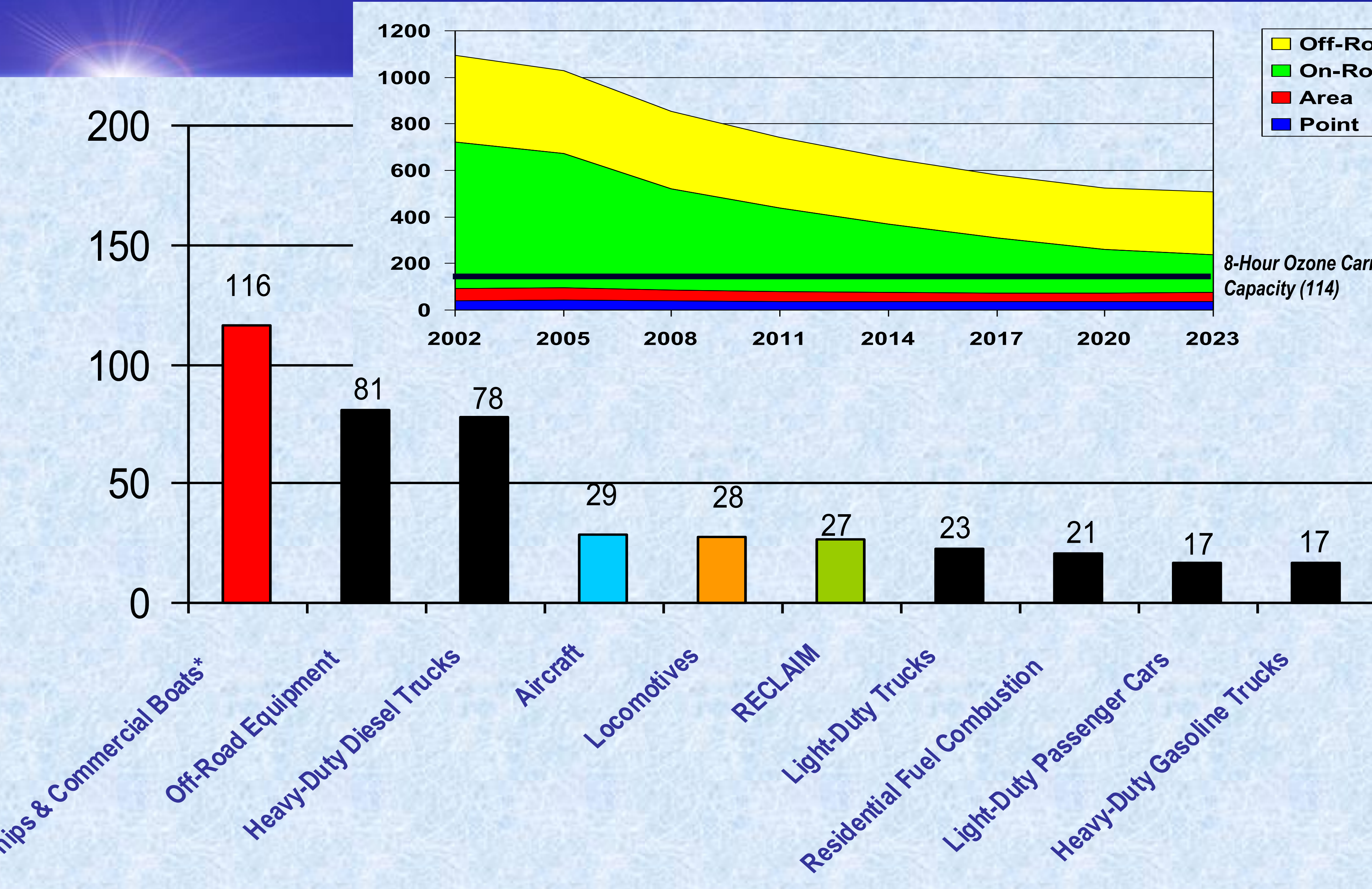
SCAB Cases/Year due to PM2.5 *

Premature Deaths	5,400
Hospitalizations	2,400
Asthma & Lower Respiratory Symptoms	140,000
Lost Work Days	980,000
Minor Restricted Activity Days	5,000,000

•1999-2000 Air Quality Data

Source: California Air Resources Board

We are not on trajectory for timely attainment



2023 NOx Emissions By Source

Need for Zero/Near Zero Emission Technologies

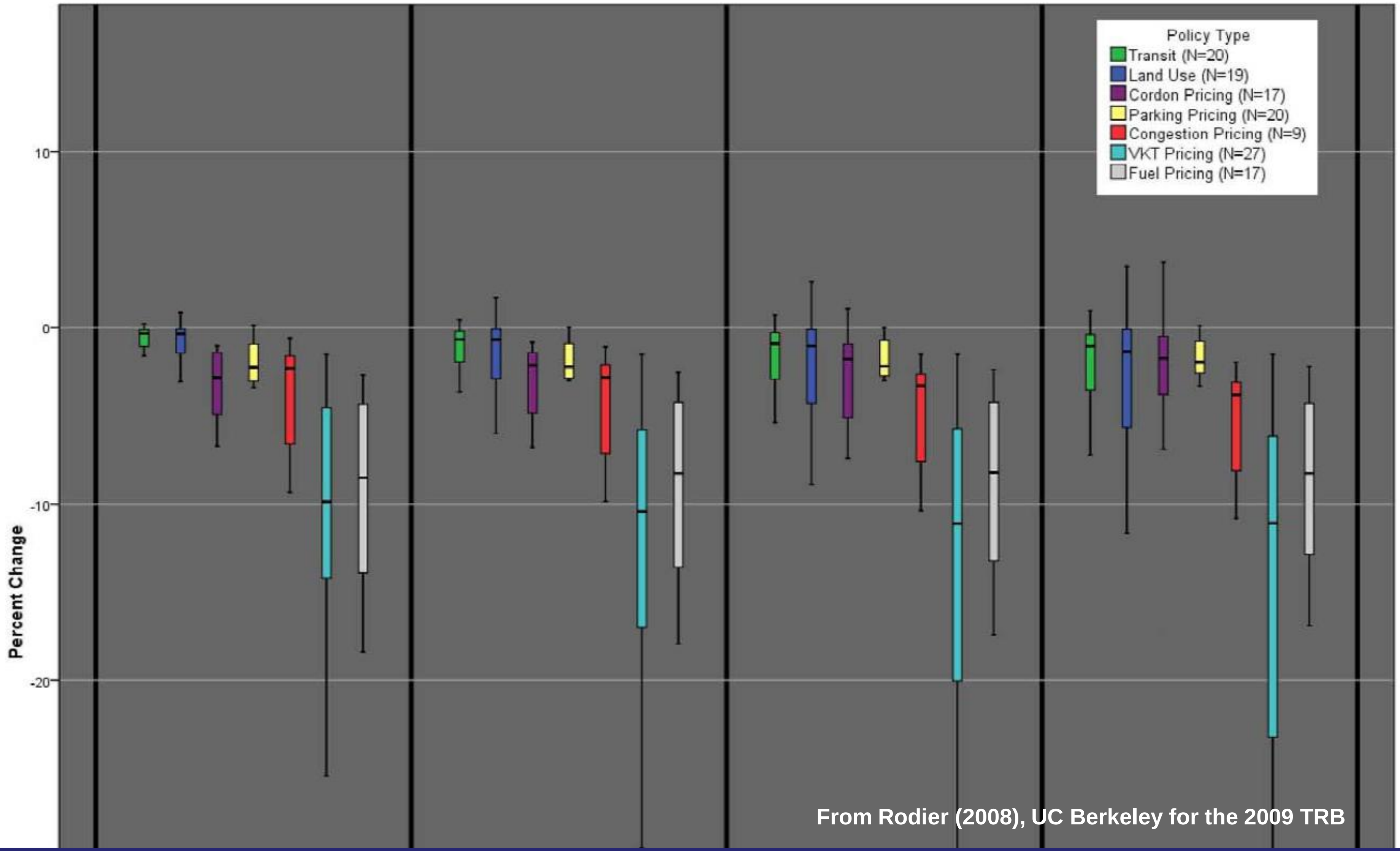
- Plans to date include insufficient measures to actually attain federal clean air standards

- Even full fleet turnover to 2010 truck standards and to the Tier 4 locomotive standards proposed by USEPA (per the RTP) will not provide sufficient reductions

- This air basin **must achieve zero and near-zero emission vehicle penetration far beyond levels assumed in ARB's EMFAC model** (which is also used for SB375 GHG calculations) to attain federal health standards.

% VMT Reduction by Individual Measures, 10 yr, 20 yr, 30 yr, 40 yr

FIGURE 1 Box Plots of Single Policy VKT Reductions by Time Horizon



But is our approach to air quality effective? SB 375 calls for a 3-5% (?) reduction in GHG from changed land use patterns and enhanced transit

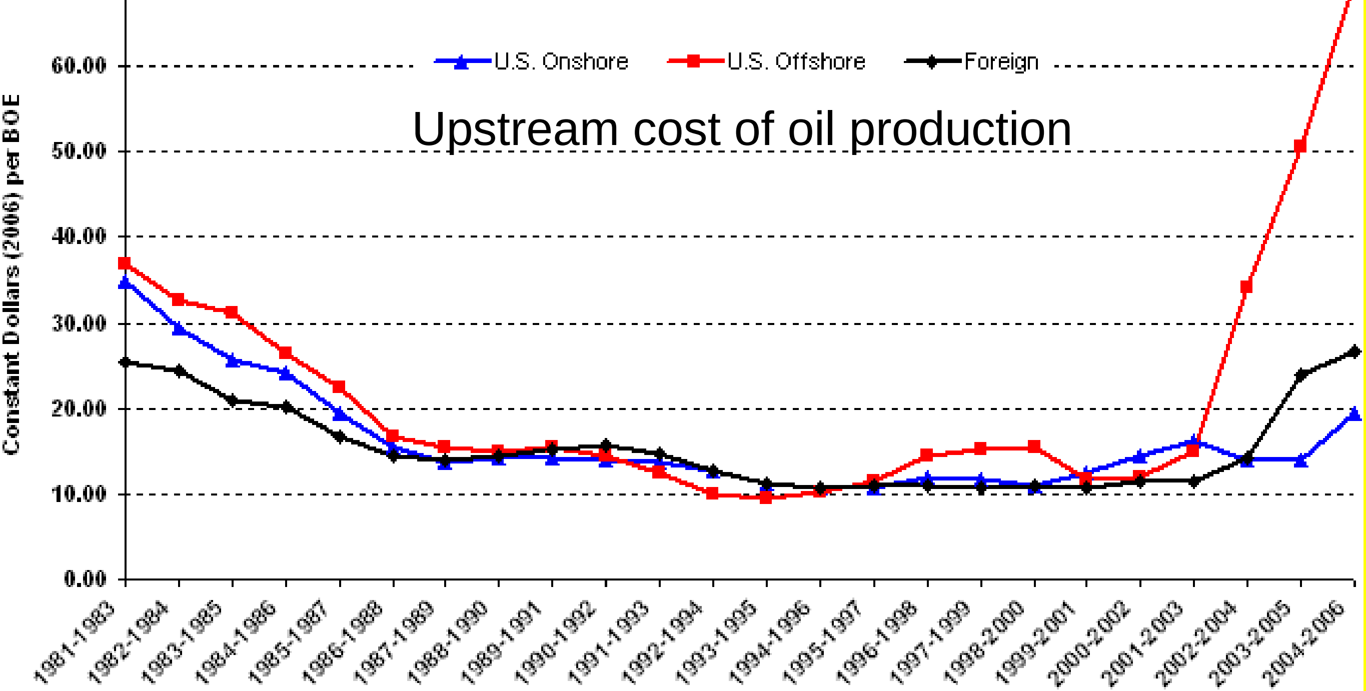
Technology?

	2004 Chevrolet Malibu	2004 Toyota Prius	Savings	Percent Reduction
EPA Emission Standard	Tier 2 Bin 8	SULEV II		
Non-Methane Organic Gases (grams) 2	1,527	122	1,405	92%
Carbon Monoxide (grams) 2	51,303	12,215	39,088	76%
Nitrogen Oxides (grams)2	2,443	244	2,199	90%
Particulate Matter (grams)2	244	122	122	50%
Carbon Dioxide (lbs)3	10,470	5,330	5,140	49%
EPA Fuel Economy (city/hwy)4	24/34	60/51		
EPA Fuel Economy (combined)5	28	55	27	
Fuel Consumed Annually (gallons)	436	222	214	49%

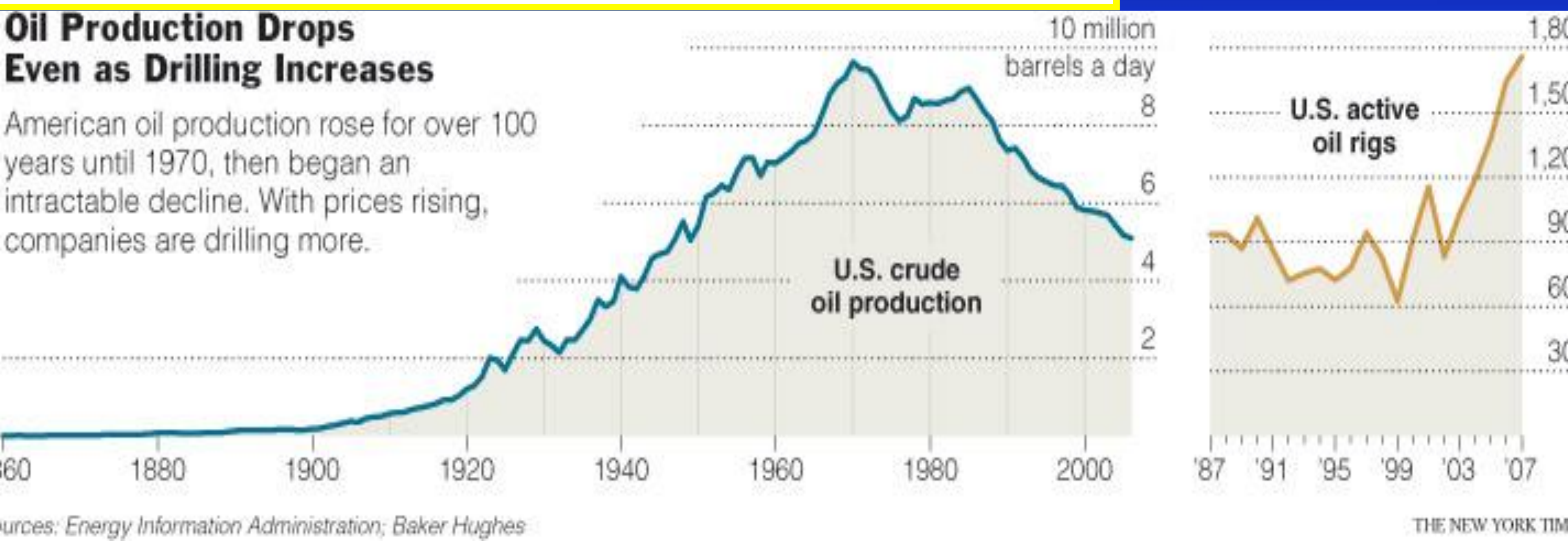
Notes
1. Based on 12,215 annual mileage.
2. Data obtained from Smog Forming Pollutants Chart, EPA Green Vehicle Guide: www.epa.gov/autoemissions/0-10chart.htm
3. Calculated using (12,215 miles / Combined MPG) x (24 pounds CO2/gallon). Includes upstream CO2 emissions and end-user CO2 emissions. David Friedman, Senior Engineer, Union of Concerned Scientists. Personal communication 7/25/2003.
4. Fuel economy rating for automatic/continuously variable transmission.
5. Assumes 55% city driving and 45% highway driving.

Emission Standard Key: Vehicles meeting the Federal Tier 2 Bin 8 standard produce: 4.2 g/mi of CO, 0.02 g/mi of particulate matter, 0.2 g/mi of NOx, and 0.125 g/mi of non-methane organic gases. Vehicles meeting California's SULEV II (Super Ultra Low Emissions Vehicle) standard produce: 1.0 g/mi of CO, 0.01 g/mi of particulate matter, 0.02 g/mi of NOx, and 0.01 g/mi of non-methane organic gases.

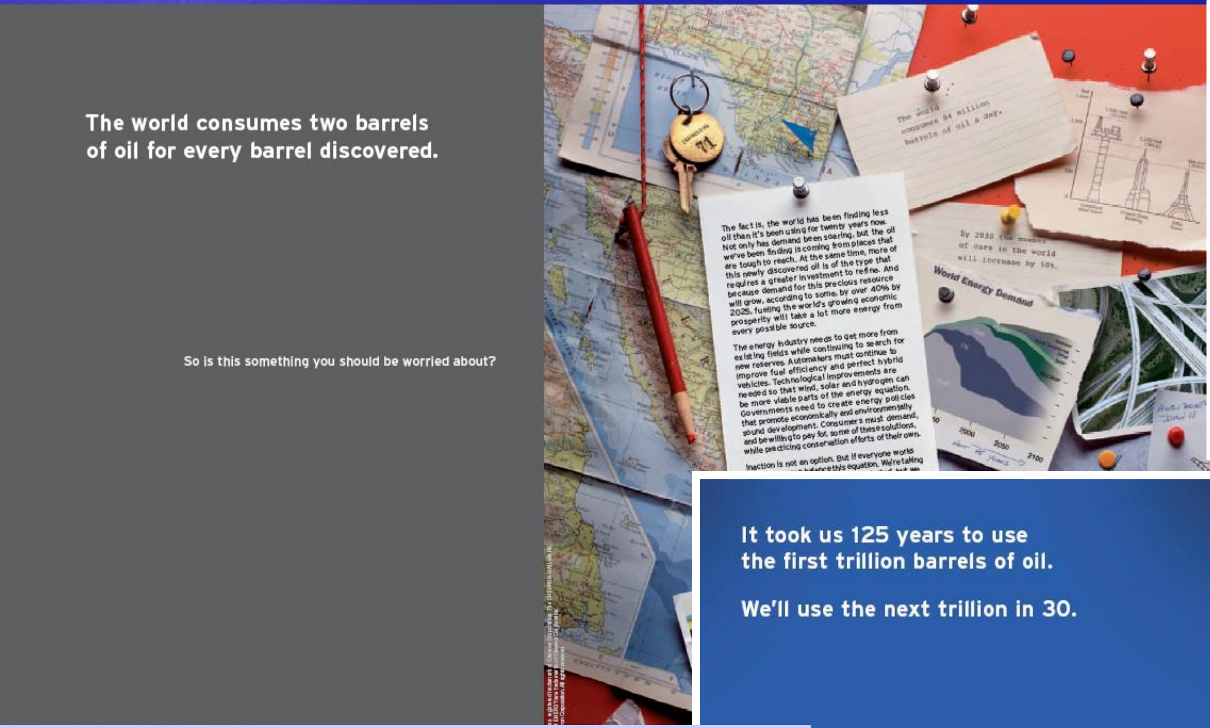
Our energy outlook: petroleum

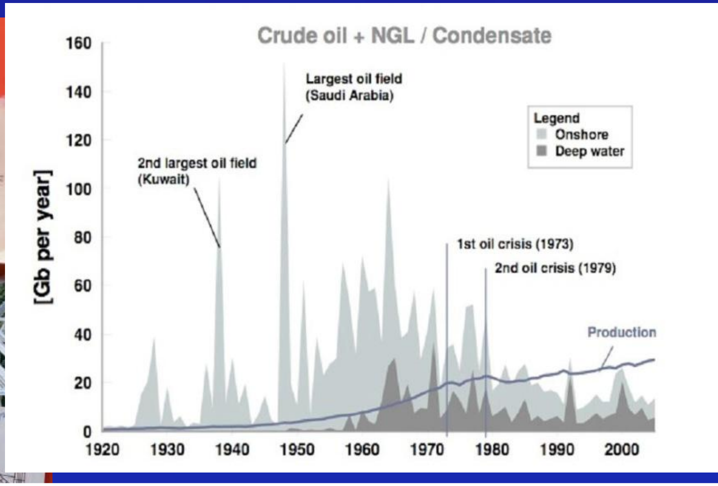


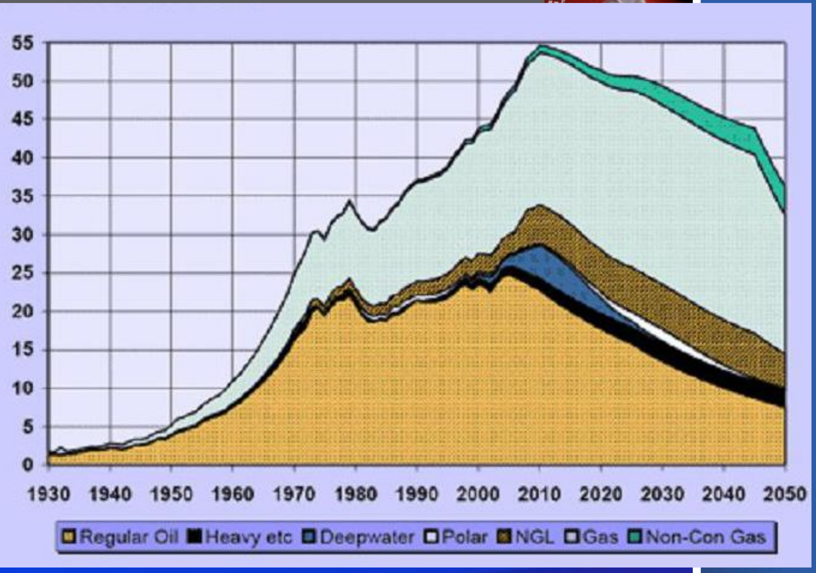
Notes: Costs are the quotient of costs and reserve additions for each three-year period. BOE = Barrels of oil equivalent.
Source: Energy Information Administration, Form EIA-28 (Financial Reporting System).

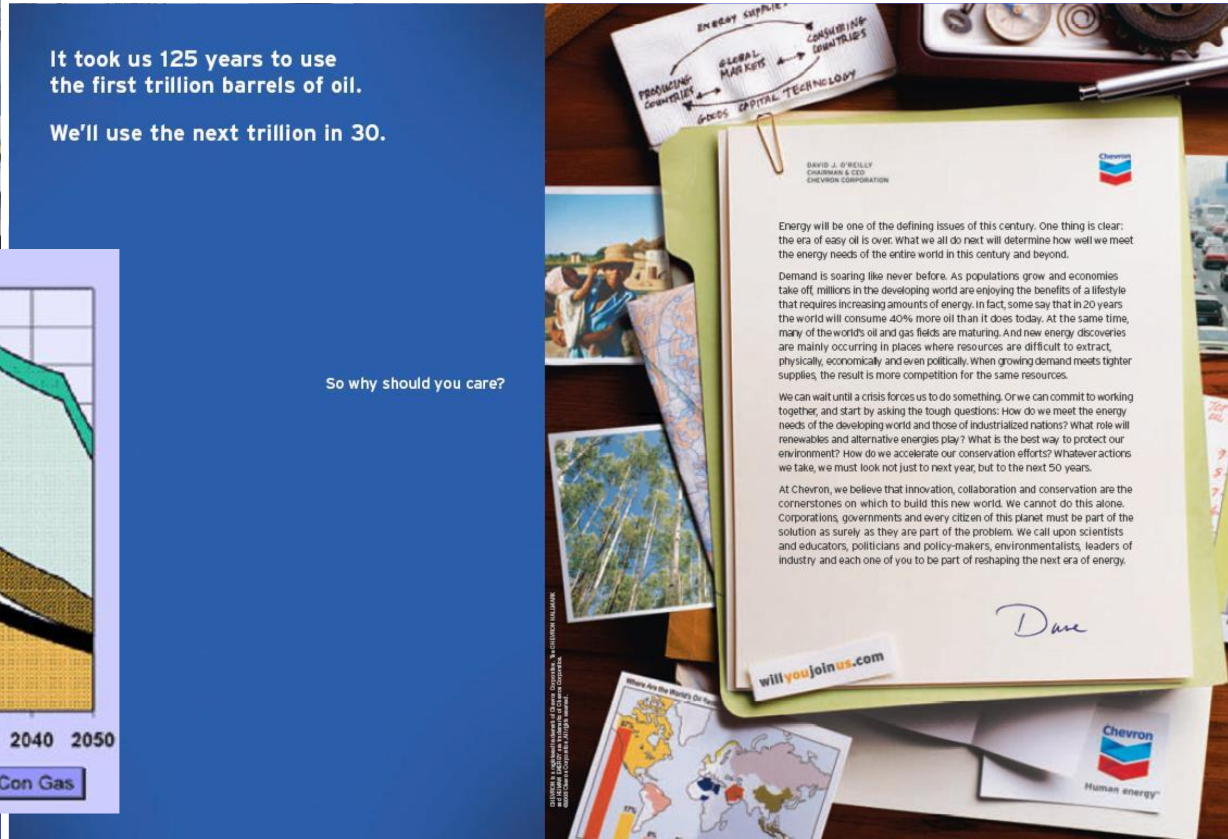


Chevron advertisements, 2005 & 2006









Over the past decades, our fossil energy sources have become less efficient

Independent of the arrival of "Peak Oil", increasing amounts of upfront energy are required to explore the next new units of energy

The concept of EROI (Energy Return on (Energy) Investment) describes this as: Energy Units Gained from one Energy Unit Used

A change of EROIs from 80:1 to 20:1 (current estimate for global oil production) equals a "salary increase" of physical work from oil by a factor of almost 4, significantly reducing benefits to our economy

- With this change of contributions from energy, economic growth becomes increasingly difficult as more and more output is used for energy generation

* Multiple sources, including Hall, Powers, Schoenberg, 2008 "Peak oil, EROI, investments and the economy in an uncertain future, Pp. 113-136 *in* Pimentel, David. (ed). Biofuels, Solar and Wind as Renewable Energy Systems", Elsevier, London

Results might be very different compared to most people's expectations

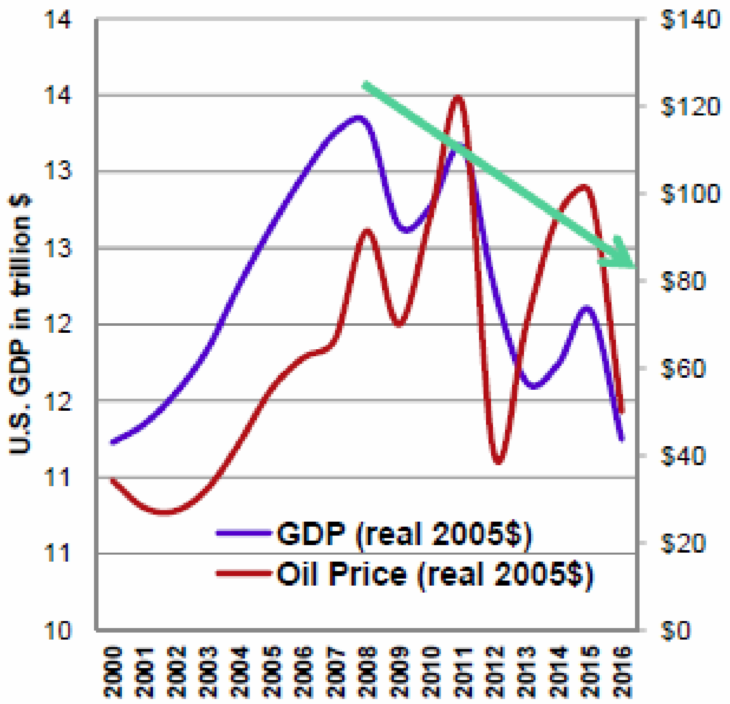
Every time we see refueled growth

- this will be curtailed by growing energy prices
- leading to a shrinking economy
- and another commodity (and energy) price crash

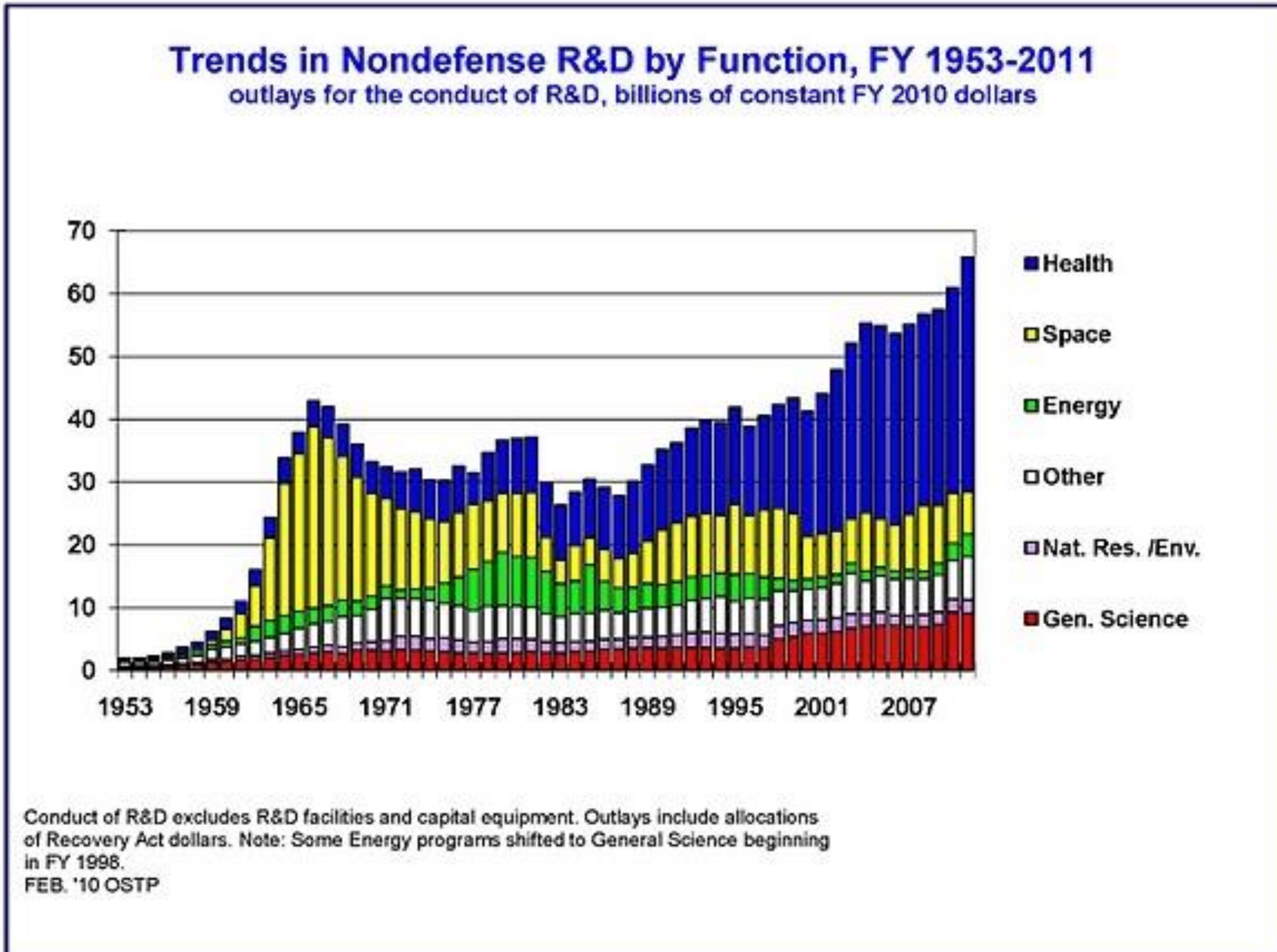
Key effects

- A downward trajectory
- Reduced readiness to invest (including investments into energy technology and exploration)
- Even fewer available resources

Potential future scenario



Research to Overcome the Energy Challenge?



Graph courtesy of Kei Koizumi, White House Office of Science and Technology Policy

Energy Efficiency

Energy produced (kinetic) per

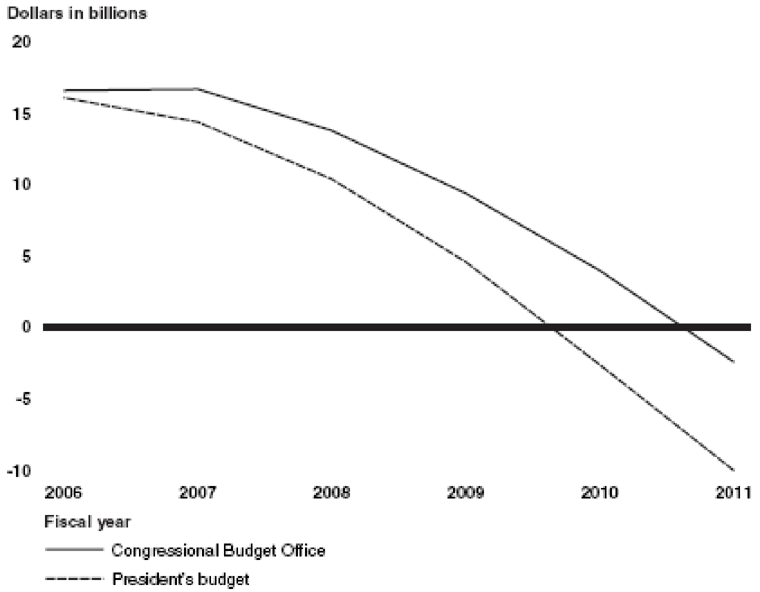
energy input (chemical or electrical)

Upper efficiency limits of various technologies:

- **Steam/external combustion: 10% single expansion, 25% multiple**
- **Gasoline (internal combustion): 37%**
- **Diesel (internal combustion): 50%+**
- **Electric: 80 – 90%+, higher horsepowers more efficient**
- **Electric generation: 50%+ simple, 90% with cogeneration**

Various sources

Figure 2: Current Highway Trust Fund Year-End Balance Estimates



Source: GAO analysis of data provided in the President's Budget and by CBO.

TRANSPORTATION FOR TOMORROW

National Surface Transportation Policy
and Revenue Study Commission

Mary Peters Secretary of Transportation — Chairperson

Jack Schenendorf Of Counsel, Covington & Burling — Vice Chair

Frank Busalacchi Wisconsin Secretary of Transportation

Maria Cino Deputy Secretary of Transportation

Rick Geddes Director of Undergraduate Studies, Cornell University

Steve Heminger Executive Director, Metropolitan Transportation Commission

Frank McArdle General Contractors Association of New York

Steve Odland Chairman and CEO, Office Depot

Patrick Quinn Chairman, American Trucking Association

Matt Rose CEO, Burlington Northern Santa Fe Railroad

Tom Skancke CEO, The Skancke Company

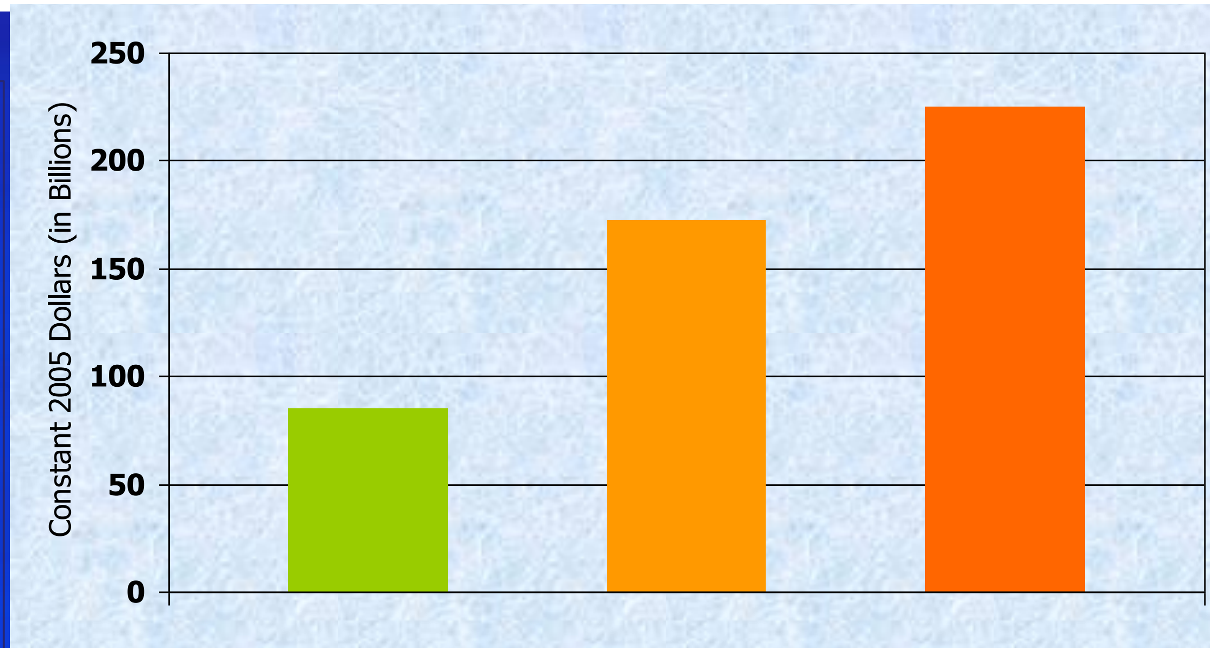
Paul Weyrich Chairman and CEO, Free Congress Foundation

Findings of the Federal 1909 Commission

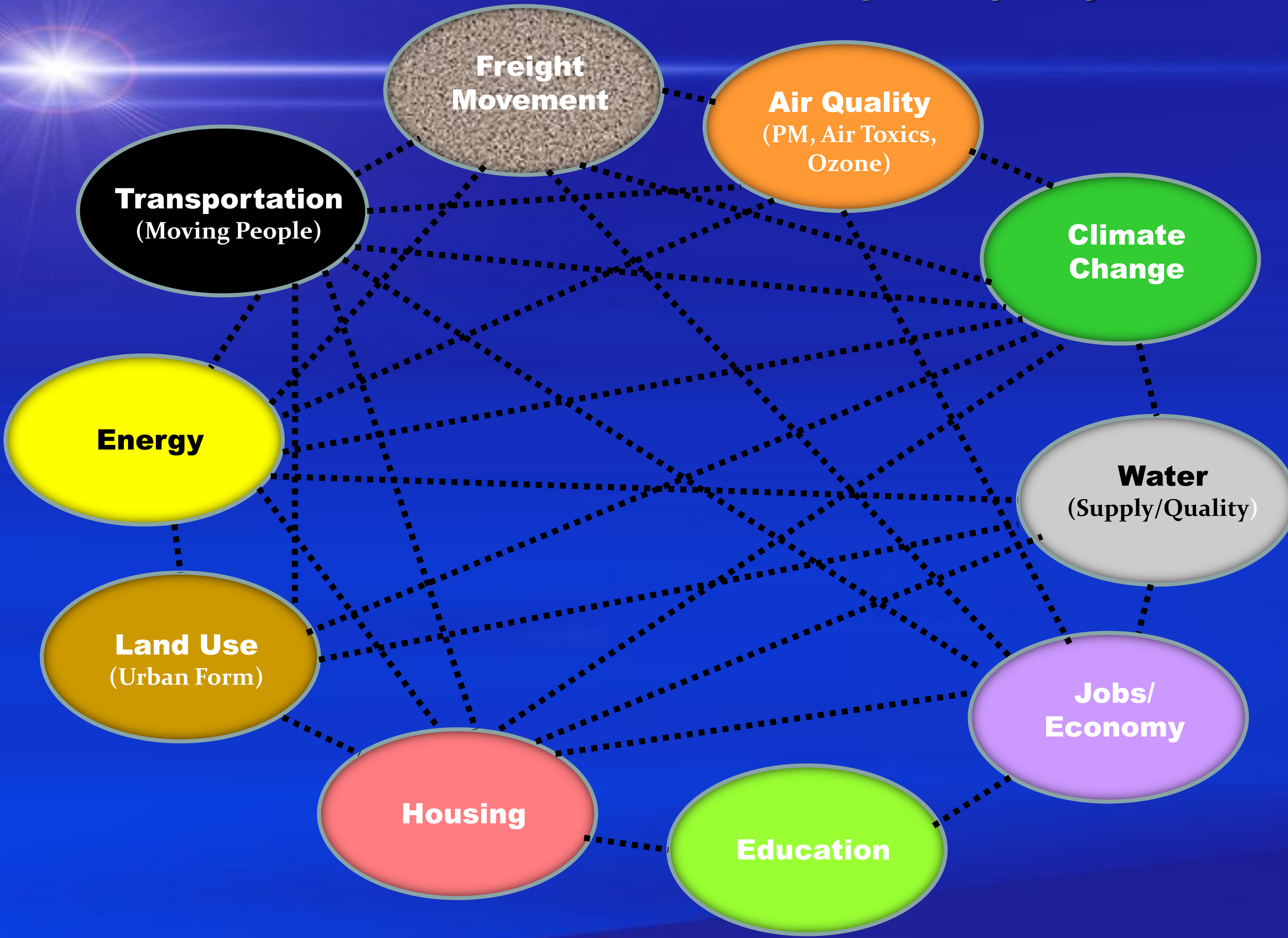
Current Funding for Capital Expenditures by Source and Mode

	Highway	Transit	Intercity Pass Rail	Freight Rail	All Modes
Total Funding	75.1	11.8	0.6	13.8	102.7
Federal	32.1	4.6	0.5		38.4
State and Local	37.7	7.2	0.1		46.6
Tolls/Private	5.4			12.4	17.8

- **Public trans spending <$100B**
- **Should be spending $225B to meet long-term needs**
- **Federal share should be historic 40% (currently 17% of $225B)**
- **But failure to maintain fee-for-use financing (eg. gas tax) will increase cost to improve to >$300B**



What is this information in combination telling us, and how can it best be used to craft public policy?



TAKEAWAYS:

Demography:

- Reduction in average per capita income tax and sales tax revenues, increasing demand for services
- Smaller labor force supporting large aging and very young populations
- Need for safer transport alternatives for the aging population
- Increased demand for small lot detached and attached residences, little demand for new large lot

Energy:

- Petroleum production may be 60% of today's by 2040, natural gas will decline more slowly
- Significant near-term reductions in EROI from limitations on fossil fuel production
- Need intense focus on development of energy alternatives
- Near-term need for energy-efficient (not just fuel efficient) technologies to reduce demand
- Trend toward compaction of non-residential uses driven by increasing transport costs

Transport: (people and goods)

- 5 million more people to move, yet most (90%+) of our 'future' infrastructure is here today
- Still expecting a doubling of freight in 20 years, need dedicated clean technology freight corridors
- Need to maximize utility of existing infrastructure

TAKEAWAYS #2

Air Quality:

- Reductions from transport sector are key, attainment requires zero/near zero technologies, *all modes, in 1-2 decades*
- Fuel tax increases would help incentivize transformation
- Transparency essential, no more "black boxes"

Greenhouse Gases:

- Technologic transformation needed for clean air is also most direct path to reduce GHG's
- Gas tax increase and pricing measures would provide far most significant near- term result
- Demographic factors and energy constraints will drive land use compaction consistent with SB375.

Transportation Finance:

- Need to double annual nationwide transportation investment if only to operate and preserve system
- Need to more than *triple* investment if fee-for-use not re-established
- Gas tax increase the most obvious and technically easy first step. Would: pay to preserve , operate, improve system; reduce demand (VMT reduction = GHG & pollutant reduction); incentivize fuel efficiency and fleet transformation; promote energy independence; continue to be a viable revenue source for 10-20 years
- VMT fee or similar revenue source needed within 10 years, container fees needed to fund freight

Are our plans aligned with these factors?

The good news:

Responses to the various challenges are remarkably synergistic

Governments
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Working Together